MODEL E-342 COMPRESSION TESTER

PURPOSE OF THE TESTER

The Allen Compression Tester shows the true condition of the entire combustion chamber. It locates leakage in the cylinder around the valves, rings or head gasket. An engine with cylinder leakage cannot be tuned for maximum performance. By locating and correcting leakage; compression, power and mileage are restored.

The E-342 Compression Tester consists of a pressure gauge unit to which adapters can be attached. Three easily attached adapters, each tipped with an oil resistant rubber cone, are furnished to facilitate insertion into any spark plug port.

GAUGE

The gauge on the Compression Tester is of the most advanced design giving accurate and dependable reading in pounds per square inch. The gauge reads from 0-200 pounds. Therefore, for example, when the pointer on the gauge reads 100, the cylinder compression is 100 pounds per square inch.

COMPRESSION

Compression as applied to automotive engines, means the maximum compression in pounds per square inch at the top of the compression stroke.

COMPRESSION RATIO

Compression pressure is dependent upon engine valve timing and compression ratio. A compression ratio, of 6 to 1, means that when a charge of gas is compressed on the compression stroke it is compressed down to 1/6 of its original volume. By confining the gas into a smaller space, the pressure is greatly increased. Therefore, the greater the compression ratio, the greater the pressure, which will be indicated on the compression gauge.

$$\text{COMPRESSION RATIO} \text{ EQUALS } \frac{\text{Volume of gas in cylinder at lower dead center.}}{\text{Volume of gas in cylinder at top dead center.}}$$

PURPOSE OF COMPRESSION TESTING

In making tests of compression, the comparison of maximum pressure indications for each cylinder and the change in pressure at each revolution of the engine is of greater importance than the actual or theoretical compression based on the engine compression ratio. In other words, an analysis of the condition of the engine parts affecting compression can be satisfactorily made without knowing the engine compression ratio and maximum compression for which the cylinder was designed.

FACTORS AFFECTING COMPRESSION

Definite compression reading specifications are not necessary to determine valve and ring condition as readings are subject to too many variables which would affect the readings. Some of these are:

Engine Temperature
Oil Temperature
Oil Viscosity
Temperature of Coolant
Condition of Battery and Cables
Condition of Starting Motor

The importance of the compression test is to determine variations in the compression between cylinders and not the absolute readings. It is not so important how high the compression is, but how uniform in each cylinder.

All engines are designed with a pre-determined angular and height lift for the valve tappet. This assures proper valve timing and the necessary lift to give highest efficiency and economy, as well as the correct compression reading. Proper compression assures maximum power and economy.

PROCEDURE FOR COMPRESSION TESTING

1. Warm up engine to normal operating temperature as indicated by oil temperature rather than the temperature of the water in the cooling system. It takes longer for the oil to reach normal temperature which is important in making compression tests.

2. To remove the spark plugs, remove secondary wires and loosen all plugs approximately two turns and then retighten against the gasket. Replace the secondary wires and start the engine and let run for one minute. Carbon broken loose when plugs were loosened will be burned or blown out exhaust. Remove all plugs, keeping them in proper sequence for inspection, (If engine is equipped with twin ignition and thus twin spark plugs, remove only one spark plug from each cylinder).

3. Lock the throttle wide open and make sure the carburetor choke valve is wide open.

PROCEDURE FOR COMPRESSION TESTING

(CONTINUED)

4. Press the rubber cone of the "gun" firmly down in the spark plug port and twist the gun slightly to the right. This will cause the threads of the spark plug port to grip the rubber cone and aid in holding the gun against the compression developed.

5. With ignition turned "Off" (On cars where the ignition switch must be turned "On" to operate the starting motor, disconnect the coil primary from the distributor or ground the High Tension Coil Lead), crank the engine with the starting motor and count the revolutions necessary for the gauge to reach maximum indication, usually 4 revolutions are sufficient.

6. Record the maximum compression reading of each cylinder. A variation of 10% (10 pounds per 100 pounds) of the average is satisfactory. If one or more cylinders show more than a 10% variation, the cause may be determined by further test.

7. If an engine is being tested and the compression readings are: #1-110 lbs.; #2--108 lbs.; #3--110 lbs.; #4--112 lbs.; #5--70 lbs.; #6--107 lbs., it is immediately known that there is leakage in #5 cylinder.

8. An automatic valve retains the pressure in the instrument so that the operator can accurately read the pressure indicated on the gauge. After the reading has been recorded, the pressure can be released by depressing the button on the side of the hand grip opposite the gauge.

COMPARISON BETWEEN CYLINDERS

Note whether or not each cylinder starts and climbs the same on the compression gauge. If, for example, one cylinder goes from 0-30-50-65 and another one goes from 0-20-40-50-55 it indicates a leaky condition of piston rings, or valves may be burned and warped.

PISTON RING OR VALVE LEAKAGE

To distinguish between piston ring leakage and valve leakage, place about a tablespoonful of heavy engine oil on top of the piston (conventional oilers are ideal for this purpose). The oil temporarily seals leakage past the piston rings. Note whether the compression is approximately the same as before, or whether it is higher. If it is the same or only five or six points higher, it indicates that the valves are leaking but if the compression is considerably higher it indicates that the leakage is around the rings.

Do not condemn the valves or rings until it is known that the valve tappet adjustment is not causing the valve to hold open.

PROCEDURE FOR COMPRESSION TESTING
(CONTINUED)

INTERMITTENT VALVE ACTION

Intermittent valve action will be indicated in the following manner. For example, if the gauge reads 40 lbs. on the first revolution and 75 lbs. on both the second and third revolutions, it would indicate that the valve did not close between the second and third revolutions of the engine. This may be caused by weak valve springs or gummy valve stems.

LEAKY HEAD GASKET

If a low compression reading is noted between two adjacent cylinders, it may be caused by a leaky head gasket between the two cylinders. This should be checked before condemning the valves or rings.

WRITING THE FACTORY

Should it be necessary to communicate with the factory, relative to your Tester, ALWAYS furnish its name, model number and serial number so that prompt and efficient attention can be rendered.

ALLEN Electric
service
equipment

ALLEN ELECTRIC AND EQUIPMENT COMPANY
2101-2117 North Pitcher Street
KALAMAZOO, 13F, MICHIGAN, U. S. A.

ALLEN EQUIPMENT REPAIR SERVICE

AUTHORIZED FIELD SERVICE STATION

Allen Equipment in need of service should be shipped to one of the Allen Authorized Field Service Stations listed on the next sheet, or the factory whichever is nearer.

To expedite prompt repairs, your return order should contain a brief explanation of the difficulty, and specifically state whether the unit is to be repaired or reconditioned.

If the equipment is to be repaired, it will be placed in proper operating condition only.

If reconditioning is requested, the leads will be replaced, the unit refinished and placed in "like new" condition.

WARRANTY SERVICE

When repairs under warranty are expected, the following must be furnished at the time the unit is shipped to the factory, or Authorized Field Service Station for repairs:

Owner's Name
Owner's Address
Wholesaler's Name
Wholesaler's Address
Model Number of Unit
Serial Number of Unit
Date of Purchase by Using Owner

By following the proper procedure, you will assist the Allen Authorized Field Service Station or the factory, in efficiently performing the work needed and returning your equipment to you with a minimum of delay.

WARRANTY POLICY

Allen equipment is warranted to be free from defects in material and workmanship under normal use and service for a period of twelve (12) months after date of delivery to the original using purchaser. This warranty is valid only to the original using purchaser.

Equipment found defective within warranty, and returned to our factory or Authorized Field Service Station, will be repaired no-charge and returned by collect transportation.

REPLACEMENT PARTS

Replacement Parts may be obtained by ordering from Field Service Stations, or from the Factory.

Always specify model and serial number of the equipment, as well as voltage and cycles, as indicated on the equipment name plate when ordering parts.

ALLEN ELECTRIC AND EQUIPMENT COMPANY
KALAMAZOO, 13F, MICHIGAN, U.S.A.

Printed in U.S.A.

CARE AND MAINTENANCE OF ALLEN ELECTRICAL EQUIPMENT

1. DO NOT allow petroleum products, acids or alkalies, to come in contact with painted surfaces or plastic components.
2. Use a clean soft cloth for a DAILY dust cloth.
3. PLASTIC PANELS, LEADS AND SOCKS should be cleaned with MILD SOAP AND WATER.
4. SMALL SCRATCHES can sometimes be removed from plastic with rouge.
5. CORRODED TERMINALS can be cleaned with a solution of baking soda and water.
6. HEAT, generated in leads and clips, which becomes more than warm to the touch is a result of a poor connection and will result in an extra load being placed on the unit.
7. LARGE ranges have been placed on meters for heavy loads, SMALL ranges for finer reading. Always select the range large enough for the job, or damage will result.
8. IN MAKING ELECTRICAL CONNECTIONS, always watch the meter when you cause the current to flow; don't overload the meter. Use the proper shunt.
9. MOISTURE is second only to grease-and-dirt in shortening the life of electrical equipment. One of the less obvious ways in which moisture can damage equipment is to store in a non-heated area. Moisture can cause meters to stick, transformers to short, insulation and condensers to deteriorate.
10. METERS REQUIRING A POWER SUPPLY. A. C. or D. C. current may be required. It may be of a high or low voltage. Exercise caution in connection of units to proper voltage source.
11. POWER TIMING LAMP. Its life will be greatly lengthened if disconnected when not in use.
12. POLARITY. Care should be exercised to see that units are not connected in reverse polarity.
13. In most cases, when units have been subjected to materials used in fire extinguishers, they may be considered beyond repair in making insurance adjustment.
14. SIX VOLT PLUG-IN RECEPTACLE UNITS will work better after a small amount of powdered graphite has been applied.
15. FANS. Units having a fan for cooling purposes cannot function well if covered, as air flow is restricted.
16. METERS exposed to the sun's rays for long periods of time will fade.
17. GROWLERS should not be turned "ON" unless first an armature has been placed into position to test.
18. UNITS USING FLASHLIGHT BATTERIES should be turned to the "OFF" position when not in use. When the batteries become discharged they should be removed at once, or damage will result.
19. IN EACH INSTANCE, REFER TO THE INSTRUCTION MANUAL BEFORE ATTEMPTING TO OPERATE. MINOR CHANGES HAVE SOMETIMES BEEN MADE, AND NEW MODELS MAY OPERATE DIFFERENTLY THAN PREVIOUS ONES.

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AUTHORIZED ALLEN SERVICE STATIONS

UNITED STATES AND CANADA

	NAME OF SERVICE STATION
ALBERTA	
Calgary	Hutton's Ltd., 131 - 11th Avenue, West
Edmonton	Loveseth Service Station Ltd., 10559 Jasper Avenue
ARIZONA	
Phoenix	Dyna-Tronics Inc., 1921 North 16th Street
Tucson	Wilson's Radio Service, 501 East Ninth Street
BRITISH COLUMBIA	
Vancouver	Instrument Service Laboratories, Ltd., 21 W. Broadway
CALIFORNIA	
Fresno	Automotive Equipment Repair, 1204 West Clinton Street
Los Angeles	Vernon Electric Co., 233 West Jefferson Boulevard
Los Angeles	Sam A. Willey, 5426 West Washington Boulevard
Oakland	Automotive Equipment Service, 293 - 26th Street
San Diego	Allen Service Center, 1125 Columbia Street
San Diego	Scott Instrument Laboratory, 3927 - 3rd Avenue
San Francisco	Battery & Electrical Equipment Service, 1016 Bryant St.
COLORADO	
Denver	Central Supply Co., 1171 Lincoln Street
Denver	Frank L. Ficca Auto Electric, 1265 Acoma Street
DIST. OF COLUMBIA	
Washington	Allen Service Center, Inc., 1724 - 14th Street, N.W.
FLORIDA	
Miami	Auto-Marine Instrument Co., 404 N.E. 13th Street
Miami	Florida Precision Instr. Repair Co., 1221 Biscayne Blvd.
GEORGIA	
Atlanta	Allen Service Center, 365 Boulevard, North East
ILLINOIS	
Chicago	Midwest Equipment Service, 2742 West Van Buren Street
Peoria	United Radio Service, 101-103 Seventh Street
KANSAS	
Salina	Wallis Equipment Co., 516 North 9th, P.O. Box 1057
LOUISIANA	
Baton Rouge	A.C.E. Equipment Sales & Service, 531 Arlington Ave.
New Orleans	A.C. Suhren Co., 4640 South Carrollton Avenue (Shipping address: 4040 Cleveland Avenue)
Shreveport	Authorized Equipment Service Co., 310 E. Stoner Avenue
MANITOBA	
St. Boniface	Fields T.V. & Radio Service, 351 Marion Street
MASSACHUSETTS	
Watertown	Electronic Tune-Up Company, 5 Louise Street
MICHIGAN	
Detroit	Randall's Battery Charger Service, 5412 Lincoln Avenue
Jackson	Hill Piston Service Company, Inc., 622 E. Michigan Ave.
MINNESOTA	
St. Cloud	Stevenson's, 22 - 5th Avenue, North
MISSOURI	
St. Louis	A.K. Sales & Service, 648 Lemay Ferry Road
NEW BRUNSWICK	
Fredericton	Craig Electric Co., Ltd., P.O. Box 961, Union Street
NEW JERSEY	
Camden	Auto Ignition & Parts, 1861 Haddon Avenue
NEW MEXICO	
Albuquerque	Automotive Equipment Repair, 4123 Silver, S.E.

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(Supersedes Form No. 251L)

(SEE OVER)

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AUTHORIZED ALLEN SERVICE STATIONS - (CONTINUED)

NEW YORK	
Lackawanna	Allen Service Centre of Buffalo, 593 Ridge Road
Rockville Centre	George Smith & Sons, Inc., 260 Maple Avenue
Troy	R. V. Farmer Carburetor & Ignition Service, 113th St. & 5th Ave.
Yonkers	Allen Service Center of Westchester, 852 Midland Avenue
NORTH CAROLINA	
Charlotte	Anderson TV & Appliance Co., 412 East Seventh Street
Raleigh	Instrument Service Co., 10-1/2 South West Street
OHIO	
Cincinnati	Pleasant Electric Co., 1725 Central Avenue
Cleveland	Makuh Electrolab, 4787 Memphis Avenue
Sidney	Dunson Supply Co., 328 North Main Street
Toledo	Luttrell Auto Supply Co., 915 Monroe Street
OKLAHOMA	
Oklahoma City	Cox Radio & Television, 111 N. W. Ninth Street
ONTARIO	
Toronto	Intricate Devices, 1103 Yonge Street
OREGON	
Gladstone	Allen Service & Training Center, 580 McLoughlin Boulevard
PENNSYLVANIA	
Philadelphia	Allen Service Center, Inc., 1371 Ridge Avenue
Pittsburgh	Wilcox Brothers, 5157 Liberty Avenue
Reading	E. S. Youse Co. Inc., 522 Chestnut Street
QUEBEC	
Montreal	J. A. Faguy & Sons Ltd., 1125 Aqueduct Street
Montreal	International Electric Co., 1037 Bleury Street
Montreal	John Millen & Sons, 639 St. James Street, West
Quebec City	Charles Boucher Inc., 558-1/2 Rue St. Vallier
SASKATCHEWAN	
Regina	Auto Electric Service, Ltd., 1845 Broad Street
SOUTH CAROLINA	
West Columbia	Columbia Electronics, 1008 Meeting Street
SOUTH DAKOTA	
Watertown	Cave Supply Co., 115 West Kemp Avenue
TENNESSEE	
Memphis	Ozburn Abston & Company, 598 Monroe Avenue
TEXAS	
Dallas	Specialized Equipment Service, Inc., 209 Henry Street
El Paso	Southwest Equipment Service, 3831 Porter Street
Houston	Allen Service Center of Houston, 1118 LaBranch
Waco	Instrument & Meter Service Co., 620 Washington Street
UTAH	
Salt Lake City	Gail F. Bywater Service, 105 East Fourth Street
VIRGINIA	
Richmond	Albin's Service, Inc., 15 West Brookland Park Blvd.
Winchester	Valley Distributors, Inc., 22 Amherst Street Box 766
WASHINGTON	
Seattle	Automotive Instrument Service, Inc., 8501 Roosevelt Road
WEST VIRGINIA	
Charleston	A & I Supply Co., 614 Virginia Street, West
WISCONSIN	
Milwaukee.	Reliance Electric Company, 1101 West Vliet Street

17.70
29.00

18.40
18.40
36.80

FORM NO. 251M

ALLEN ELECTRIC AND EQUIPMENT COMPANY
KALAMAZOO, MICHIGAN, U.S.A.